



NOAA Weather Wire Service (NWWs) Project

NWWs Interface Information Document

Version 0.3

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National Weather Service
National Oceanic and Atmospheric Administration
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Table of Contents

| | | |
|--------|--|----|
| 1. | Introduction..... | 6 |
| 2. | Interface and Data Flow Diagrams | 7 |
| 3. | Interface Point 6 (INTF 6) – SBN to Satellite receivers..... | 9 |
| 3.1. | Description/Purpose/Directionality..... | 9 |
| 3.2. | Interface Characteristics..... | 9 |
| 3.2.1. | Satellite Signal Characteristics | 9 |
| 3.2.2. | End User Satellite Receive System Specifications | 10 |
| 3.3. | Other Relevant Interface Information | 15 |
| 4. | Interface Point 7 (INTF 7) – NWWs-SAT End User Satellite Receiver to End User Application..... | 16 |
| 4.1. | Description/Purpose/Directionality..... | 16 |
| 4.2. | Interface Characteristics..... | 16 |
| 4.2.1. | Application Layer | 16 |
| 4.2.2. | Transport Layer..... | 16 |
| 4.2.3. | Internet Layer..... | 16 |
| 4.2.4. | Network Access Layer..... | 16 |
| 4.3. | Other Relevant Interface Information | 16 |
| 5. | Interface Point 8 (INTF 8) – NIDS XMPP Server to OI End Users..... | 19 |
| 5.1. | Description/Purpose/Directionality | 19 |
| 5.2. | Interface Characteristics | 19 |
| 5.2.1. | Application Layer | 19 |
| 5.2.2. | Transport Layer..... | 20 |
| 5.2.3. | Internet Layer..... | 20 |
| 5.2.4. | Network Access Layer..... | 20 |
| 5.3. | Other Relevant Interface Information | 20 |
| 6. | Interface Point 9 (INTF 9) – Nlets FEP servers and Nlets server in Phoenix, AZ | 21 |
| 6.1. | Description/Purpose/Directionality | 21 |
| 6.2. | Interface Characteristics | 21 |
| 6.2.1. | Application Layer | 21 |
| 6.2.2. | Transport Layer..... | 21 |
| 6.2.3. | Internet Layer..... | 21 |
| 6.2.4. | Network Access Layer..... | 21 |
| 6.3. | Other Relevant Interface Information | 21 |

| | | |
|-----|--|----|
| 7. | APPENDIX A – Valid NWWS Product List..... | 22 |
| 8. | APPENDIX B - NTWC and PTWC Product List | 23 |
| 9. | APPENDIX C – NOAAPort Transport Layer Protocol | 25 |
| 10. | APPENDIX D – Sample NWWS message..... | 29 |

Table of Figures

| | |
|--|----|
| Figure 1 - Notional Diagram of NWWS Interfaces | 7 |
| Figure 2 – NWWS Product Source to Dissemination Interface Data Flow..... | 8 |
| Figure 3 - NWWS Satellite Receive System | 11 |

Revision History

| Revision Number | Date | Editor | Comments |
|-----------------|-----------------|--------------------------|--|
| Draft 0.1 | June 11, 2014 | Jim McNitt | Initial draft, populated with information from the ICD |
| Draft 0.2 | July 15, 2014 | Jim McNitt | Incorporated comments and new SBN frequency |
| Draft 0.3 | August 26, 2014 | Systems Engineering Team | Updated terrestrial ingest for NWWS-OI |
| | | | |
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| | | | |

1. Introduction

This NWWS Interface Information Document (NIID) defines the public-facing interfaces of the NOAA Weather Wire Service (NWWS). It is a subset of the NWWS Interface Control Document (ICD).

The major components that comprise the NWWS are:

- AWIPS-II Infrastructure, including AWIPS-II systems, the NCF, MGS and SBN
- Tsunami Warning Systems at the Pacific Tsunami Warning Center (PTWC) and National Tsunami Warning Center (NTWC)
- NWS Telecom Gateway (NWSTG)
- NWS Internet Dissemination System (NIDS)
- NWS Telecommunications Operations Center (TOC), and
- NWWS-SAT End User receive systems

WRIP-2 NWWS is a systems integration effort involving multiple development organizations operating somewhat independently. The purpose of the ICD is to document the interfaces between the components such that systems can be successfully integrated and tested at the completion of development. It can also be used to communicate external interface changes to NWWS end users.

The following interfaces are included in this document:

1. SBN to Satellite receivers.
2. NWWS-SAT End User Satellite Receiver to End User Application.
3. NIDS XMPP Server to OI End Users.
4. Nlets FEP servers and Nlets server in Phoenix, AZ.

The following information is documented for each interface:

- High level description
- Interface characteristics
- Other relevant interface information

2. Interface and Data Flow Diagrams

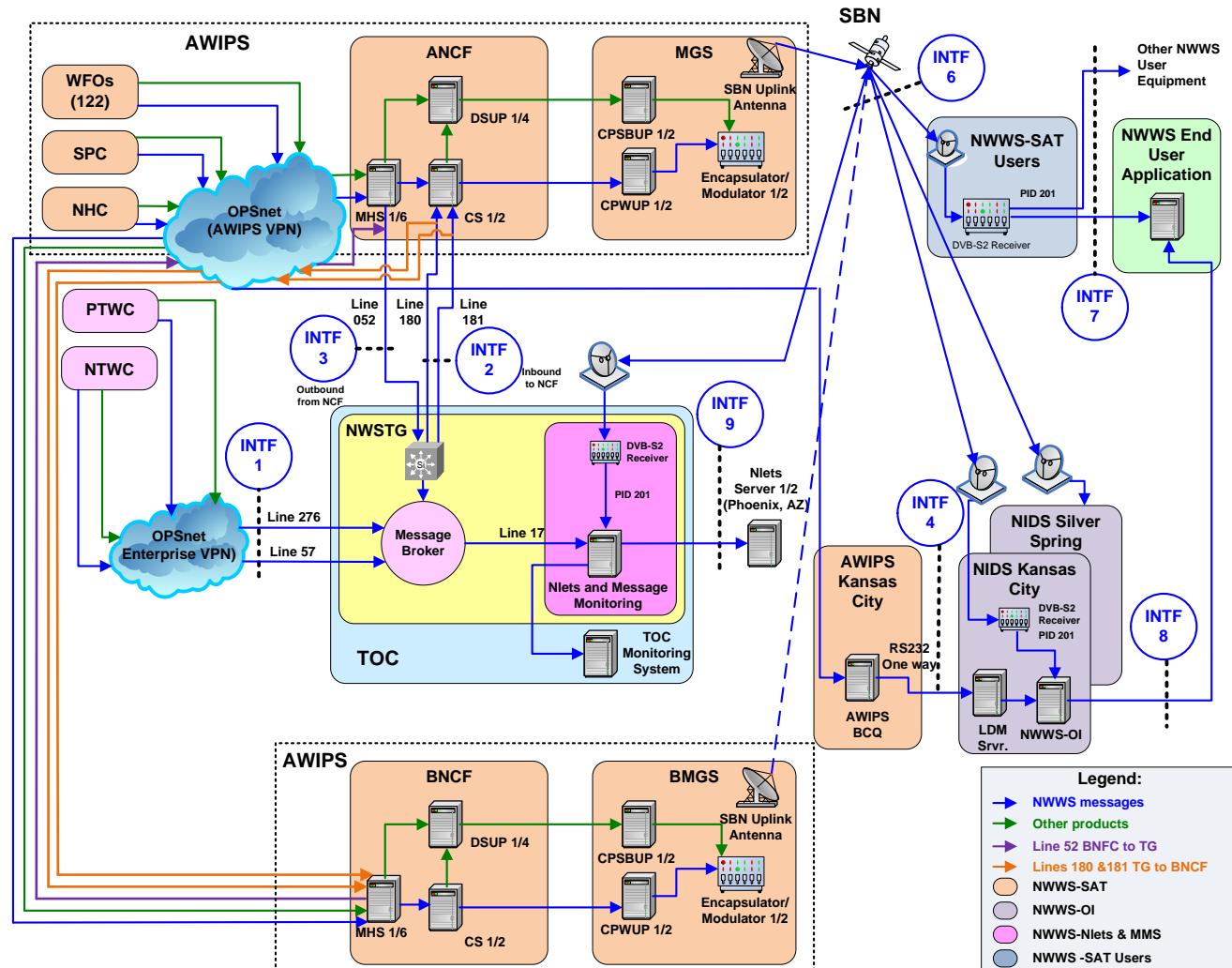


Figure 1 - Notional Diagram of NWWs Interfaces

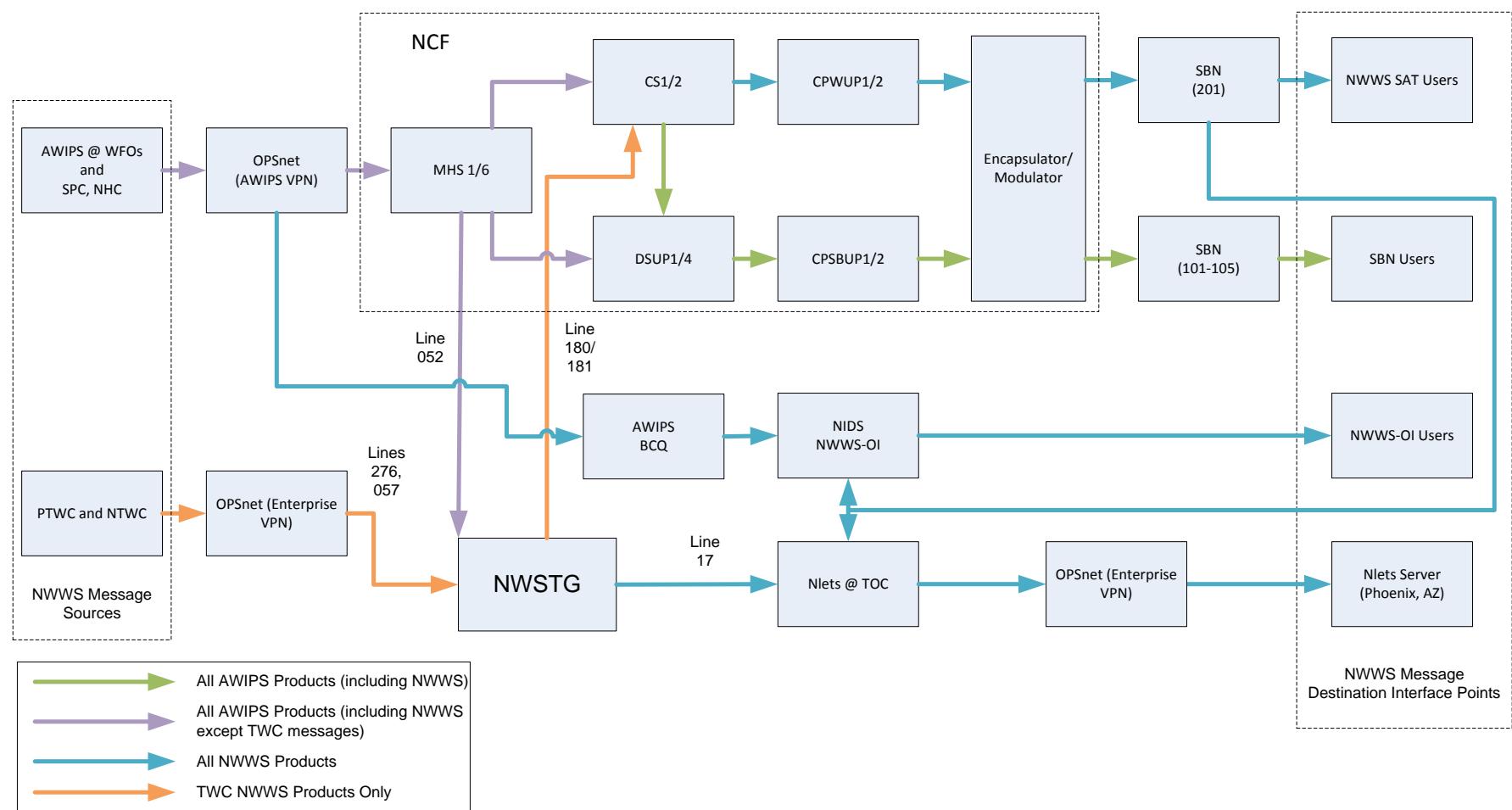


Figure 2 – NWWS Product Source to Dissemination Interface Data Flow

3. Interface Point 6 (INTF 6) – SBN to Satellite receivers

3.1. Description/Purpose/Directionality

Interface Point 6 (INTF 6) is the interface between:

- AWIPS-II Satellite Broadcast Network (SBN) air interface
- End User satellite receive system

The purpose of this interface is to allow compatible satellite antenna/receiver/demodulators to receive the SBN satellite carrier and decode the data of interest on the SBN. The SBN has the following “logical” data channels:

- **AWIPS/NOAAPort** (channels 101-105) - contains all AWIPS products (observations, forecasts, models, etc and including NWWS messages) and other information of interest (international model data, etc) to AWIPS and NOAAPort users. It is important to note that most NWWS messages can be found on these channels.
- **NWWS** (channel 201) - contains the complete NWWS message feed, exclusively. No additional data is transmitted on this channel.

This is a one-way interface, a satellite broadcast to the receive system, and as a result there is no flow control.

3.2. Interface Characteristics

3.2.1. Satellite Signal Characteristics

At the time this document is being developed, the AWIPS SBN signal characteristics are those described in the table below:

| Item | Specification |
|-----------------------------------|--|
| Satellite: | SES-1 |
| Transponder: | 15C |
| Uplink center frequency: | 6220.850 MHz |
| Downlink center frequency: | 3995.850MHz |
| L-band Downlink center frequency: | 1154.150 MHz, using a C-band LNB with a 5150 MHz Local Oscillator and spectral inversion |
| Symbol Rate: | 15.120 Msps |
| Occupied bandwidth: | 19.7 MHz |
| FEC Type: | DVB-S2 |

| | |
|---|-----------------|
| Modulation/Coding for NWWS (PID 201) channel | QPSK – 1/3 rate |
| Modulation/Coding for AWIPS/NOAAPort (PID 101-105) channels | 8PSK – 2/3 rate |

The SBN satellite carrier is in the process of being expanded. This expansion is tentatively scheduled to take place in September, 2014. The information about the SBN expansion is provided at: http://www.nws.noaa.gov/noaaport/html/noaaport_expansion.shtml. It is recommended that users verify the latest updates at this website.

The new SBN parameters are described in the table below:

| Item | Specification |
|---|--|
| Satellite: | SES-1 |
| Transponder: | 17C |
| Uplink center frequency: | 6265.0 MHz |
| Downlink center frequency: | 4040.0 MHz |
| L-band Downlink center frequency: | 1110.0 MHz, using a C-band LNB with a 5150 MHz Local Oscillator and spectral inversion |
| Symbol Rate: | 30Msps |
| Occupied bandwidth: | 36 MHz |
| FEC Type: | DVB-S2 |
| Modulation/Coding for NWWS (PID 201) channel | QPSK – 1/3 rate |
| Modulation/Coding for AWIPS/NOAAPort (PID 101-108) channels | 16APSK – 3/4 rate |

3.2.2. End User Satellite Receive System Specifications

The recommended NWWS Satellite receive system (figure 1) consists of the following components:

- 1.8m or 2.4m C-band receive-only antenna with a single polarization (SP) linear feed
- Suitable antenna mount as required for local installation
- C-band PLL Low Noise Block downconverter (LNB)
- RG11 plenum rated coaxial cable, up to 300 ft
- DVB-S2 Satellite IP Receiver

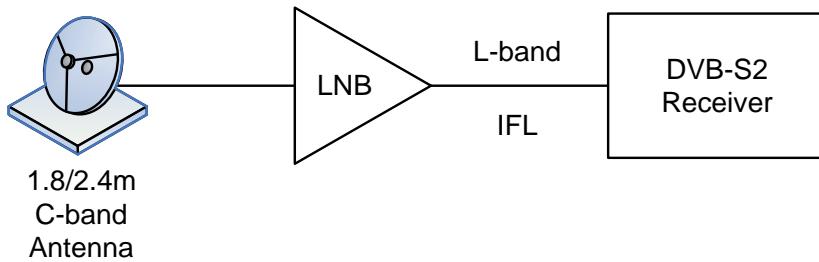


Figure 3 - NWWS Satellite Receive System

| C-band Receive-Only Antenna Specifications | |
|---|---------------|
| Antenna Size | |
| CONUS | 1.8m |
| Alaska, Hawaii & Puerto Rico | 2.4m |
| Operating Frequency | 3.7 – 4.2 GHz |
| Midband Gain (± 0.2 dB) | |
| CONUS | 35.5 dBi |
| Alaska, Hawaii & Puerto Rico | 37.5 dBi |
| 3 dB Beamwidth | |
| CONUS | 2.9° |
| Alaska, Hawaii & Puerto Rico | 2.1° |
| Antenna Noise Temperature | |
| CONUS | |
| 20° elevation | 49°K |
| 30° elevation | 47°K |
| Alaska, Hawaii & Puerto Rico | |
| 20° elevation | 33°K |
| 30° elevation | 31°K |
| Polarization | Linear |
| VSWR | 1.3:1 Max. |
| Feed Interface | CPR229F |
| Wind Loading | |

| | |
|------------------------|--|
| Operational | As required for local environment |
| Survival | As required for local environment |
| Temperature | |
| Operational | As required for local environment |
| Survival | As required for local environment |
| Atmospheric Conditions | Salt, Pollutants and Contaminants as Encountered in Coastal and Industrial Areas |
| Solar Radiation | 360BTU/h/ft ² |

| C-band PLL Low Noise Block downconverter (LNB) Specifications | |
|--|--|
| Noise Temperature | 20°K |
| L.O. Stability (over temperature excluding offset) | ±10 kHz |
| Phase Noise (SSB) | -73 dBc/Hz at 1 kHz -83 dBc/Hz at 10 kHz -93 dBc/Hz at 100 kHz |
| Input VSWR | 2.2:1 |
| Output VSWR | 2.2:1 |
| Input Frequency | 3.7 to 4.2 GHz |
| Output Frequency | 950 to 1450 MHz |
| Conversion Gain | 60 dB |
| Output P1dB | 60 dBm |
| Power requirements | +15 to +24 VDC supplied through center conductor of IF cable |
| Current Drain | 330 mA |
| Input Waveguide Flange | CPR229G |
| Output Coaxial Connector | 75 Ohm type F female |
| Temperature | As required for local environment |

| Coaxial Cable Specifications (Typical) | |
|---|--|
| Cable Type | RG-11 75 Ohm Coaxial Cable, Bare Copper Conductor, Plenum rated (for indoor use) |

| | |
|--|---------------------------|
| DC Resistance | |
| Conductor | 2.9 Ohms/1000 ft. nominal |
| Shield | 3.9 Ohms/1000 ft. nominal |
| Attenuation | |
| 900 MHz | 4.7 dB/100 ft. nominal |
| 1000 MHz | 5.0 dB/100 ft. nominal |
| 1450 MHz | 6.7 dB/100 ft. nominal |
| Connectors | 75 Ohm, type F male |
| Note: The maximum attenuation between the LNB output and the DVB-S2 IP Receiver should not exceed 20 dB. If longer IFL lengths are required, a design analysis will be required. | |

| DVB-S2 Satellite IP Receiver Specifications | |
|--|---|
| Receive Frequency | 950 to 1450 MHz |
| Frequency Acquisition | $\pm 50\%$ of Symbol Rate up to ± 10 MHz |
| Input Signal Level | -65 dBm to -25 dBm |
| Multi-Standard Demodulation | QPSK: 1.5 to 45 Msps (DVB-S) QPSK: 1.5 to 45 Msps (DVB-S2) 8PSK: 1.5 to 30 Msps (DVB-S2) |
| Variable Code Modulation (VCM) Operation | Receiver must support VCM. VCM receivers are capable of decoding a single input stream of a DVB-S2 carrier that has multiple input streams and a unique modulation/coding scheme for each input stream. |
| Data Throughput | 80 Mbps |
| Nyquist Root Filter | 0.2, 0.25, 0.35 rolloff |
| Multi-Standard Decoding FEC | |
| DVB-S | Viterbi 1/2, 2/3, 3/4, 5/6, 6/7, 7/8 rates Reed Solomon |
| DVB-S2 | LDPC 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 BCH decoder |
| Typical DVB-S Performance @ 30 Msps | C/N |
| QPSK FEC 1/2 | 3.5 dB |

| | |
|--|---|
| QPSK FEC 2/3 | 5.2 dB |
| QPSK FEC 3/4 | 6.3 dB |
| QPSK FEC 5/6 | 7.4 dB |
| QPSK FEC 7/8 | 8.1 dB |
| Typical DVB-S2 Performance for 1E-7 QEF with Pilots @ 30 Msps | C/N |
| QPSK FEC 1/2 | 1.2 dB |
| QPSK FEC 2/3 | 3.3 dB |
| QPSK FEC 3/4 | 4.2 dB |
| QPSK FEC 5/6 | 5.4 dB |
| QPSK FEC 8/9 | 6.4 dB |
| QPSK FEC 9/10 | 6.7 dB |
| 8PSK FEC 2/3 | 6.9 dB |
| 8PSK FEC 3/4 | 8.2 dB |
| 8PSK FEC 5/6 | 9.7 dB |
| 8PSK FEC 8/9 | 11.1 dB |
| LNB Supply Voltage | 11/15V, 13/18V, 21 V or off |
| LNB Supply Current | 400 mA with short circuit and Surge Protection |
| Configuration | IP Address Configuration PID Selection LNB Power Transponder Settings Symbol Rate Frequency Band Power |
| Hardware Capabilities | Multiprotocol Encapsulation (MPE) PID Filters: 16 |
| RF Input Connector | 75 Ohm type F female |
| LAN Interface | 10/100 Base T, RJ-45 |
| Temperature | |
| Operational | 0° to 40°C |

| | |
|--------------------|--|
| Survival | -50 to +50°C |
| Operating Humidity | 10 to 90%, non-condensing |
| Standards | UDP/IP Protocol IP Multicast IGMP: V1.0, V2.0 ETSI 301 192 DVB ETSI 302 307 DVB-S2 ETSI 301 192 MPE IEEE 802.3 10/100 Mbps |

3.3. Other Relevant Interface Information

None

4. Interface Point 7 (INTF 7) – NWWS-SAT End User Satellite Receiver to End User Application

4.1. Description/Purpose/Directionality

Interface Point 7 (INTF 7) is the interface between:

- NWWS End User satellite receivers (See specification in Section 0)
- NWWS End User application or peripheral device

The purpose of this interface is to deliver data from the satellite receiver/demodulator to end user software applications and devices. The receiver can be configured to output either the AWIPS/NOAAPort logical data channels (101-105) or the NWWS channel (201). Selection of either the AWIPS/NOAAPort or NWWS channels is a satellite receiver configuration but this interface describes the data being received on channel 201.

This is a unidirectional interface, from the satellite receivers to the end-user applications or devices.

4.2. Interface Characteristics

4.2.1. Application Layer

The application layer protocol for NWWS data transmitted over the SBN uses an AWIPS Product Identifier (which includes the WMO header). More information about the AWIPS WMO header can be found at:

<http://www.nws.noaa.gov/tg/awips.php>

4.2.2. Transport Layer

The transport layer protocol is UDP. However, the End User satellite receiver also passes the SBN transport layer protocol to the End User application. More information on this protocol can be found in Appendix C and at:

<http://www.nws.noaa.gov/noaaport/html/transprt.shtml>

4.2.3. Internet Layer

The internet layer protocol is IP multicast.

4.2.4. Network Access Layer

The network access layer protocol between the NWWS-SAT receiver and the End-User application is a standard LAN interface.

4.3. Other Relevant Interface Information

The following table contains information necessary for configuring the End User satellite receiver. Please see section 8 for additional information. Also, a sample NWWS message captured using Wireshark at Interface Point 7 can be found in Appendix D.

At the time this document is being developed, the receiver is configured according to the SBN signal characteristics are those described in the table below:

| Receiver Parameter | Value |
|-------------------------------|--------------------------|
| IP Address Configuration | To be Configured by User |
| PID Selection | 201 |
| LNB Power | On |
| Transponder Settings | |
| Symbol Rate | 15.120 Msps |
| Band | Off |
| Power | On |
| RF Frequency | 3995.85 MHz |
| L.O. Frequency | 5150 MHz |
| L-Band Frequency | 1154.15 MHz |
| MODCOD | 1/3 QPSK |
| Polarization | Vertical |
| Mode of Operation | DVB-S2 |
| Input Stream Identifier (ISI) | 2 |

The receiver configuration after the SBN satellite expansion, tentatively scheduled to take place in September, 2014, is shown in the table below. The latest information about the SBN expansion is provided at: http://www.nws.noaa.gov/noaaport/html/noaaport_expansion.shtml.

| Receiver Parameter | Value |
|---------------------------|--------------------------|
| IP Address Configuration | To be Configured by User |
| PID Selection | 201 |
| LNB Power | On |
| Transponder Settings | |
| Symbol Rate | 30.0 Msps |
| Band | Off |

| Receiver Parameter | Value |
|-------------------------------|--------------|
| Power | On |
| RF Frequency | 4040.0 MHz |
| L.O. Frequency | 5150 MHz |
| L-Band Frequency | 1110.0 MHz |
| MODCOD | 1/3 QPSK |
| Polarization | Vertical |
| Mode of Operation | DVB-S2 |
| Input Stream Identifier (ISI) | 2 |

5. Interface Point 8 (INTF 8) – NIDS XMPP Server to OI End Users

5.1. Description/Purpose/Directionality

Interface Point 8 (INTF 8) is the interface between:

- NIDS XMPP Server
- NWWs-OI end-users

The purpose of this interface is to push data from the NIDS XMPP server to OI end user software applications and devices. The XMPP server will push products that are inserted into the MUC room based on which clients are subscribed to that room. Users can expect to receive subscribed data within 1 minute of receipt by the NIDS system. This is a unidirectional interface, with the XMPP server pushing data to the subscribed users.

5.2. Interface Characteristics

5.2.1. Application Layer

At the application layer, the NIDS XMPP server will push data using XMPP. The XMPP server will serve data from ports 5222 and 5223. All messages sent from the XMPP server will use a concise payload, with raw data being embedded within a dedicated XML namespace. For example:

```
<message type='groupchat' id='blah' to='nwws@conference.weather.gov'>
<body>BOX issues Area Forecast Discussion</body>
<x xmlns='nwws' product_id='201302281756-KBOX-FXUS61-AFDBOX'>
  FXUS61 KBOX 281756
  AFDBOX

  AREA FORECAST DISCUSSION
  NATIONAL WEATHER SERVICE TAUNTON MA
  1256 PM EST THU FEB 28 2013
  ....
</x>
</message>
```

5.2.2. Transport Layer

The transport layer protocol between the NIDS XMPP server and the OI End Users is TCP.

5.2.3. Internet Layer

The internet layer protocol between the NIDS XMPP server and the OI End Users is IPv4.

5.2.4. Network Access Layer

The network access layer protocol between the NIDS XMPP server and the OI End Users is a standard LAN interface.

5.3. Other Relevant Interface Information

None

6. Interface Point 9 (INTF 9) – Nlets FEP servers and Nlets server in Phoenix, AZ

6.1. Description/Purpose/Directionality

Interface Point 9 (INTF 9) is the interface between:

- Nlets FEP servers at NWS TOC
- Nlets Headquarters server in Phoenix, AZ

The purpose of this interface is to disseminate NWWS messages to members of the public safety and law enforcement community. The Nlets FEP servers (primary and backup) push data to the Nlets server in Phoenix, AZ in an XML wrapper using SOAP.

This is a unidirectional interface, from the Nlets FEP servers to the Nlets server in Phoenix, AZ.

6.2. Interface Characteristics

6.2.1. Application Layer

The application layer protocol between the Nlets FEP servers and the Nlets server is HTTP. Valid WMO messages are wrapped in the Nlets HR XML¹ and pushed using a SOAP interface to Nlets Headquarters.

6.2.2. Transport Layer

The transport layer protocol between the Nlets FEP servers and the Nlets server is TCP.

6.2.3. Internet Layer

The internet layer protocol between the Nlets FEP servers and the Nlets server is IPv4.

6.2.4. Network Access Layer

The network access layer protocol between the Nlets FEP servers and the Nlets server is a standard LAN interface connected by the Enterprise VPN of OPSnet, which is a trusted MPLS network.

6.3. Other Relevant Interface Information

None

¹ Information on Nlets XML format can be found in: Nlets User and Technical Guide – Appendix D – Nlets Web Services, originally revised 01/01/03.

7. APPENDIX A – Valid NWWS Product List

The current list of over 11,000 authorized NWWS products can be found at:

<http://www.nws.noaa.gov/nwws/productinfo.html>

Then click on **WMO Headers of all products on NWWS**

8. APPENDIX B - NTWC and PTWC Product List

The product list provided below is effective July 2007. The latest product lists are available at:

<http://ntwc.arh.noaa.gov/pdf/products.pdf>

| | WMO Headers | NWW PIL internal use only | AWIPS ID | Message Explanation | |
|-----------------------|-------------|------------------------------|----------|---|------------------------|
| Originated by WC/ATWC | WEPA41 PAAQ | ANCTSUWCA | TSUWCA | Tsunami Warning/Watch/Advisory [AK & West Coast > 7.0] | West Coast, BC, Alaska |
| | WEPA43 PAAQ | ANCTIBWCA | TIBWCA | Tsunami Information Statement [AK & West Coast 6.5 to 7.0] | |
| | SEAK71 PAAQ | ANCEQIAKX | EQIAKX | Tsunami Information Statement [Alaska < 6.5] | |
| | SEUS71 PAAQ | ANCEQIWOC | EQIWOC | Tsunami Information Statement [West Coast & BC < 6.5] | |
| | WEAK51 PAAQ | ANCTSUAK1 | TSUAK1 | Public Tsunami Warning/Watch/Advisory [AK & West Coast > 7.0] | |
| | WEAK53 PAAQ | ANCTIBAK1 | TIBAK1 | Public Tsunami Information Statement [Pacific 6.5 to 7.5] | |
| | WEXX20 PAAQ | ANCTSUAT1 | TSUAT1 | Tsunami Warning/Watch/Advisory [Atlantic AOR] | |
| | WEXX22 PAAQ | ANCTIBAT1 | TIBAT1 | Tsunami Information Statement [Atlantic AOR] | |
| | WEXX30 PAAQ | ANCTSUATE | TSUATE | Public Tsunami Warning/Watch/Advisory [Atlantic AOR] | |
| | WEXX32 PAAQ | ANCTIBATE | TIBATE | Public Tsunami Information Statement [Atlantic AOR] | |
| | SEXX60 PAAQ | ANCEQIAT1 | EQIAT1 | Tsunami Information Statement [Atlantic AOR] | |
| | NTXX98 PAAQ | ANCTSTMSG | TSTMSG | Test Message | |

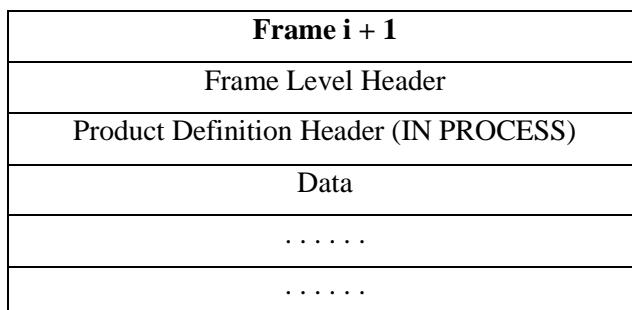
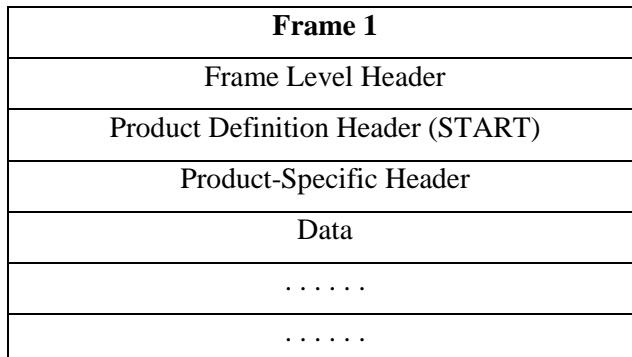
| | WMO Headers | NWW PIL internal use only | AWIPS ID | Message Explanation | |
|--------------------|-------------|------------------------------|----------|--|-----------|
| Originated by PTWC | WEPA40 PHEB | HFOTSUPAC | TSUPAC | Tsunami Warning/Watch/Advisory [Pacific > 7.5] | Pacific |
| | WEPA42 PHEB | HFOTIBPAC | TIBPAC | Tsunami Information Statement [Pacific 6.5 to 7.5] | |
| | WEHW40 PHEB | HFOTSUHWX | TSUHWX | Tsunami Warning for Hawaii Civil Defense | |
| | WEHW42 PHEB | HFOTIBHWX | TIBHWX | Tsunami Information Statement for Hawaii Civil Defense | |
| | SEHW70 PHEB | HFOEQIHWX | EQIHWX | Information Message [Hawaii < 6.5] | |
| | WECA41 PHEB | HFOTSUCAX | TSUCAX | Tsunami Watch [Non-U.S. Caribbean] | Carib. |
| | WECA43 PHEB | HFOTIBCAX | TIBCAX | Tsunami Information Statement [Non-U.S. Caribbean] | |
| | WEIO21 PHEB | HFOTSUIOX | TSUIOX | Tsunami Watch [Indian Ocean] | Indian O. |
| | WEIO23 PHEB | HFOTIBIOX | TIBIOX | Tsunami Information Statement [Indian Ocean] | |
| | NTXX98 PHEB | HFOTSTMSG | TSTMSG | Test Message | |

9. APPENDIX C – NOAAPort Transport Layer Protocol

The Satellite Broadcast Network (SBN) protocol was created for the **NOAAPORT** Broadcast System (NBS) to provide for packet fragmentation and reassembly, to multiplex multiple product types into a single packet (for future consideration) and to multiplex multiple logical channels onto one data stream. The SBN header is divided into three functional areas: a 16-byte frame-level header that provides fixed locations for the HDLC header and locations for logical channel control; 16-byte product-definition header that uniquely defines the product(s) being transferred and permits the multiplexing of multiple products into the packet; and an optional 32-byte product-specific header that defines the specific product being transmitted.

| Generalized SBN Header</TH> | | |
|-----------------------------|------------------------------------|----------------------------------|
| Frame-Level Header (FH) | Product-Definition Header (PDH) | Product-Specific Header (PSH) |

In application, the product-specific header is followed by the data. Each time a new product is started, the product-definition header indicates the start of a product, and the product-specific header details the AWIPS-specific information about the product. The succeeding packets then contain the data instead of the product-specific header. When all the data for a particular product are delivered, the product-definition header will indicate the end of the product.



| |
|---------------------------------|
| Frame Level Header |
| Product Definition Header (END) |
| Data |

The following tables provide details on these header sections. The product-specific header is AWIPS specific and conveys information about the product so that processing of that product is more efficient. Note: there may be additional fields in the data stream that are not listed below. These fields are not necessary to the end user and can generally be ignored.

| Frame-Level Header | | |
|---------------------------|----------------------|---|
| Field | Size (octets) | Description |
| HDLC Address | 1 | The HDLC Address field. This field is always all 1s (broadcast). |
| HDLC Control | 1 | The HDLC Control Field. This field is not used. |
| SBN version | 1 | The most significant four bits indicate the SBN version. The least significant four bits indicates the header length in 32 bit words, including the HDLC address/control fields. |
| SBN Control | 1 | This is a reserved field used by the transmitter to indicate the logical channel of the message packet. This field is not currently being used. |
| SBN command | 1 | This is the message packet command field. The following command values and associated functions are currently implemented: 3=Product format data transfer 5=Synchronize timing 10=Test message |
| SBN data stream | 1 | Identifies the channel (data stream): 1=GOES EAST 2=GOES WEST 3=Reserved 4=Non-GOES Imagery/DCP 5=NCEP/NWSTG 6=Reserved 7=Reserved |
| SBN source | 1 | Source of data transmission: 1=Generated at primary NCF 2=Reserved |
| SBN destination | 1 | Destination of data transmission: 0>All |
| SBN sequence number | 4 | Unique sequence number for each frame. This field is used in detecting lost packets. Currently ARQ or selective repeat is not implemented. |
| SBN run | 2 | Unique run identifier. This field will be incremented each time the sequence number is reset. |
| SBN checksum | 2 | Checksum is used for frame validation (for future consideration). |

| Product-Definition Header | | |
|--|----------------------|---|
| Field | Size (octets) | Description |
| Product-Definition Header Version Number | 1 | The most significant 4 bits identify the product definition version. The least significant 4 bits indicate the header length in 32-bit words. |
| Transfer Type | 1 | <p>Identifies the status of the product transfer:</p> <ul style="list-style-type: none"> 1=Start of a new product 2=Product transfer still in progress 4=End (last packet) of this product 8=Product error 16=Product Retransmit 32=Product Abort <p>Unpublished Information:</p> <ul style="list-style-type: none"> - Transfer Type is a bit mask of possible values - Value 0x40 is defined as "XFR_MORE_HDR" |
| Header Length | 2 | Total length of product header in bytes for this frame, including options. |
| Block Number | 2 | Used during fragmentation and reassembly to identify the sequence of the fragmented blocks. |
| Data Block Offset | 2 | Offset in bytes where the data for this block can be found. |
| Data Block Size | 2 | Number of data bytes in the data block. |
| Records per Block | 1 | Number of records within the data block. This permits multiple records per block. |
| Blocks per Record | 1 | Number of blocks a record spans. Records can span multiple blocks. |
| Product Sequence Number | 4 | Unique product sequence number for this product within the logical data stream. Used for retransmission. |

| Product-Specific Header | | |
|---------------------------------|----------------------|--|
| Field | Size (octets) | Description |
| Option Field Number | 1 | These three fields precede the first block of a product. |
| Option Field Type | 1 | |
| Option Field Length | 2 | |
| Product-Specific Header Version | 1 | AWIPS product-specific header version number. |

| | | |
|------------------------------|---|--|
| Product-Specific Header Flag | 1 | Header flag indicating start of a specific product (1), that transfer is in progress (2), and the completion of a specific product transfer (4). |
| Product-Specific Data Length | 2 | Length of AWIPS data header (in bytes). |
| Number of Bytes per Record | 2 | For GOES images, this is the number of bytes per scan line. |
| Product-Specific Type | 1 | Identifies the type of the product Type: 1=GOES EAST 2=GOES WEST 3=Non-GOES Imagery/DCP 4=NCEP/NWSTG 5=NEXRAD |
| Product-Specific Category | 1 | Identifies the category of the product, ie., image, graphic, text. |
| Product Code | 2 | Identifites the code of the product. |
| Fragments | 2 | Total number of fragments this product was broken into. 0=multiple products in this frame #=number of fragments -1=unknown |
| Next Header Offset | 2 | Offset in bytes from the beginning of this product-specific header to the next product-specific header. Reserved for future consideration. |
| Base Product Sequence Number | 4 | Product sequence number as sent by NCF |
| Base Product Source | 2 | Product source identification |
| Product Start Time | 4 | Time that product started being processed |
| Product NCF Receive Time | 4 | Time that product started being received at NCF |
| Product NCF Transmit Time | 4 | Time that product started transmit at NCF |
| Process Control Flag | 2 | Control Flag: 0=OK 1=Abort receive list 2=Discard |
| Put-Buffer-Last | 2 | Last Buffer to put on list |
| Buffer: First on list | 2 | Buffer number currently at head of list |
| Buffer: Expected Total | 2 | Total Buffers expected for the product |
| Product-Specific Run ID | 4 | Unique product-specific run identifier. |

10. APPENDIX D – Sample NWWS message

Below is a sample of a live message captured using Wireshark at INTF 7:

```

ff 00 14 00 03 08 01 00 .....z .....
0010 00 07 db 08 00 00 02 09 14 47 00 34 00 00 00 00 ..... .G.4....
0020 0d 50 01 01 00 17 8c e8 01 00 00 24 10 01 00 00 .P..... .$.....
0030 00 00 04 01 00 0d 00 00 00 00 00 00 00 00 00 00 ..... .....
0040 51 b9 d6 08 51 b9 d6 0a 00 00 00 00 40 0c 00 01 Q...Q... ....@...
0050 52 55 4b 57 42 43 02 00 00 00 71 06 0d 0e 18 01 RUKWBC.. .q.....
0060 4b 44 45 4e 41 53 55 53 36 33 20 4b 4c 42 46 20 KDENASUS 63 KLBF
0070 31 33 31 34 32 34 0d 0d 0a 52 54 50 4c 42 46 0d 131424.. .RTPLBF.
0080 0d 0a 4d 41 58 2f 4d 49 4e 20 54 45 4d 50 45 52 ..MAX/MI N TEMPER
0090 41 54 55 52 45 20 41 4e 44 20 50 52 45 43 49 50 ATURE AN D PRECIP
00a0 49 54 41 54 49 4f 4e 20 54 41 42 4c 45 0d 0d 0a ITATION TABLE...
00b0 46 4f 52 20 57 45 53 54 45 52 4e 20 41 4e 44 20 FOR WEST ERN AND
00c0 4e 4f 52 54 48 20 43 45 4e 54 52 41 4c 20 4e 45 NORTH CE NTRAL NE
00d0 42 52 41 53 4b 41 0d 0d 0a 4e 41 54 49 4f 4e 41 BRASKA.. .NATIONA
00e0 4c 20 57 45 41 54 48 45 52 20 53 45 52 56 49 43 L WEATHE R SERVIC
00f0 45 20 4e 4f 52 54 48 20 50 4c 41 54 54 45 20 4e E NORTH PLATTE N
0100 45 0d 0d 0a 39 32 34 20 41 4d 20 43 44 54 20 54 E...924 AM CDT T
0110 48 55 20 4a 55 4e 20 31 33 20 32 30 31 33 0d 0d HU JUN 1 3 2013..
0120 0a 0d 0d 0a 3a 20 54 45 4d 50 45 52 41 54 55 52 ....: TE MPERATUR
0130 45 20 56 41 4c 55 45 53 20 52 45 50 52 45 53 45 E VALUES REPRESE
0140 4e 54 20 59 45 53 54 45 52 44 41 59 53 20 48 49 NT YESTE RDAYS HI
0150 47 48 53 2e 2e 2e 4c 4f 57 53 20 4f 56 45 52 20 GHS...LO WS OVER
0160 54 48 45 20 50 41 53 54 0d 0d 0a 3a 20 31 32 20 THE PAST ...: 12
0170 48 4f 55 52 53 20 41 4e 44 20 32 34 20 48 4f 55 HOURS AN D 24 HOU
0180 52 20 50 52 45 43 49 50 49 54 41 54 49 4f 4e 2e R PRECIP ITATION.
0190 2e 2e 49 4e 43 4c 55 44 49 4e 47 20 53 4e 4f 57 ..INCLUD ING SNOW
01a0 46 41 4c 4c 20 41 4e 44 20 53 4e 4f 57 20 20 0d FALL AND SNOW .
01b0 0d 0a 3a 20 44 45 50 54 48 20 45 4e 44 49 4e 47 ...: DEPT H ENDING
01c0 20 41 54 20 37 20 41 4d 20 43 45 4e 54 52 41 4c AT 7 AM CENTRAL
01d0 20 44 41 59 4c 49 47 48 54 20 54 49 4d 45 2e 0d DAYLIGH T TIME..
01e0 0d 0a 0d 0d 0a 2e 42 52 20 4c 42 46 20 30 36 31 .....BR LBF 061
01f0 33 20 43 20 44 48 30 31 2f 54 41 49 52 5a 58 2f 3 C DH01 /TAIRZX/
0200 44 48 30 37 2f 54 41 49 52 5a 50 2f 50 50 44 52 DH07/TAI RZP/PPDR
0210 5a 5a 2f 53 46 44 52 5a 5a 2f 53 44 49 52 5a 5a ZZ/SFDRZ Z/SDIRZZ
0220 0d 0d 0a 3a 0d 0d 0a 3a 20 20 20 20 20 20 20 53 ....: S
0230 54 41 54 49 4f 4e 20 4e 41 4d 45 20 20 20 20 20 TATION N AME
0240 20 20 20 20 20 4d 41 58 20 20 2f 20 4d 49 4e 20 MAX / MIN
0250 20 2f 20 32 34 2d 48 4f 55 52 20 2f 20 53 4e 4f / 24-HO UR / SNO

```

0260 57 20 2f 20 53 4e 4f 57 0d 0d 0a 3a 20 20 20 20 20 w / SNOW:
 0270 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20 20
 0280 20 20 20 20 20 20 20 20 20 20 54 45 4d 50 20 2f 20 TEMP /
 0290 54 45 4d 50 20 2f 20 50 52 45 43 49 50 20 20 20 2f TEMP / P RECIP /
 02a0 20 46 41 4c 4c 20 2f 20 44 45 50 54 48 0d 0d 0a FALL / DEPTH...
 02b0 4c 42 46 20 20 3a 20 4e 4f 52 54 48 20 50 4c 41 LBF : N ORTH PLA
 02c0 54 54 45 20 41 49 52 50 4f 52 54 3a 20 20 20 38 TTE AIRP ORT: 8
 02d0 37 20 20 2f 20 20 34 37 20 20 2f 20 20 20 30 2e 7 / 47 / 0.
 02e0 30 30 20 20 2f 20 20 30 2e 30 20 2f 20 20 20 30 00 / 0.0 / 0
 02f0 0d 0d 0a 56 54 4e 20 20 3a 20 56 41 4c 45 4e 54 ...VTN : VALENT
 0300 49 4e 45 20 41 49 52 50 4f 52 54 20 20 20 3a 20 INE AIRP ORT :
 0310 20 20 37 31 20 20 2f 20 20 34 38 20 20 2f 20 20 71 / 48 /
 0320 20 30 2e 30 30 20 20 2f 20 20 30 2e 30 20 2f 20 0.00 / 0.0 /
 0330 20 20 30 0d 0d 0a 42 42 57 20 20 3a 20 42 52 4f 0...BB W : BRO
 0340 4b 45 4e 20 42 4f 57 20 41 49 52 50 4f 52 54 20 KEN BOW AIRPORT
 0350 20 3a 20 20 20 38 31 20 20 2f 20 20 35 30 20 20 : 81 / 50
 0360 2f 20 20 20 30 2e 30 30 20 20 2f 20 20 20 20 4d / 0.00 / M
 0370 20 2f 20 20 20 4d 0d 0d 0a 41 4e 57 20 20 3a 20 / M.. .ANW :
 0380 41 49 4e 53 57 4f 52 54 48 20 41 49 52 50 4f 52 AINSWORT H AIRPOR
 0390 54 20 20 20 3a 20 20 20 37 36 20 20 2f 20 20 35 T : 76 / 5
 03a0 30 20 20 2f 20 20 20 30 2e 30 30 20 20 2f 20 20 0 / 0.00 /
 03b0 20 20 4d 20 2f 20 20 20 4d 0d 0d 0a 4f 4e 4c 20 M / M...ONL
 03c0 20 3a 20 4f 4e 45 49 4c 4c 20 41 49 52 50 4f 52 : ONEIL L AIRPOR
 03d0 54 20 20 20 20 20 20 3a 20 20 20 38 32 20 20 2f T : 82 /
 03e0 20 20 35 33 20 20 2f 20 20 20 30 2e 30 30 20 20 53 / 0.00
 03f0 2f 20 20 20 20 4d 20 2f 20 20 20 4d 0d 0d 0a 54 / M / M...T
 0400 49 46 20 20 3a 20 54 48 45 44 46 4f 52 44 20 41 IF : TH EDFORD A
 0410 49 52 50 4f 52 54 20 20 20 20 3a 20 20 20 20 38 30 IRPORT : 80
 0420 20 20 2f 20 20 34 39 20 20 2f 20 20 20 20 30 2e 30 / 49 / 0.0
 0430 30 20 20 2f 20 20 20 20 4d 20 2f 20 20 20 20 4d 0d 0 / M / M.
 0440 0d 0a 2e 45 4e 44 0d 0d 0a 0d 0d 0a 3a 20 54 45 ...END..: TE
 0450 4d 50 45 52 41 54 55 52 45 20 56 41 4c 55 45 53 MPERATUR E VALUES
 0460 20 52 45 50 52 45 53 45 4e 54 20 59 45 53 54 45 REPRESE NT YESTE
 0470 52 44 41 59 53 20 48 49 47 48 53 2e 2e 2e 4c 4f RDAYS HI GHS...LO
 0480 57 53 20 4f 56 45 52 20 54 48 45 20 50 41 53 54 WS OVER THE PAST
 0490 0d 0d 0a 3a 20 31 32 20 48 4f 55 52 53 20 41 4e ...: 12 HOURS AN
 04a0 44 20 32 34 20 48 4f 55 52 20 50 52 45 43 49 50 D 24 HOU R PRECIP
 04b0 49 54 41 54 49 4f 4e 2e 2e 2e 49 4e 43 4c 55 44 ITATION. ..INCLUD
 04c0 49 4e 47 20 53 4e 4f 57 46 41 4c 4c 20 41 4e 44 ING SNOW FALL AND
 04d0 20 53 4e 4f 57 20 20 20 0d 0d 0a 3a 20 44 45 50 SNOW ...: DEP
 04e0 54 48 20 45 4e 44 49 4e 47 20 41 54 20 36 20 41 TH ENDIN G AT 6 A
 04f0 4d 20 4d 4f 55 4e 54 41 49 4e 20 44 41 59 4c 49 M MOUNTA IN DAYLI
 0500 47 48 54 20 54 49 4d 45 2e 0d 0d 0a 0d 0d 0a 2e GHT TIME

| | | | |
|------|-------------------------|-------------------------|-------------------|
| 0510 | 42 52 20 4c 42 46 20 30 | 36 31 33 20 4d 20 44 48 | BR LBF 0 613 M DH |
| 0520 | 30 31 2f 54 41 49 52 5a | 58 2f 44 48 30 36 2f 54 | 01/TAIRZ X/DH06/T |
| 0530 | 41 49 52 5a 50 2f 50 50 | 44 52 5a 5a 2f 53 46 44 | AIRZP/PP DRZZ/SFD |
| 0540 | 52 5a 5a 2f 53 44 49 52 | 5a 5a 0d 0d 0a 3a 0d 0d | RZZ/SDIR ZZ...:. |
| 0550 | 0a 3a 20 20 20 20 20 20 | 20 53 54 41 54 49 4f 4e | .: STATION |
| 0560 | 20 4e 41 4d 45 20 20 20 | 20 20 20 20 20 20 20 4d | NAME M |
| 0570 | 41 58 20 20 2f 20 4d 49 | 4e 20 20 2f 20 32 34 2d | AX / MI N / 24- |
| 0580 | 48 4f 55 52 20 2f 20 53 | 4e 4f 57 20 2f 20 53 4e | HOUR / S NOW / SN |
| 0590 | 4f 57 0d 0d 0a 3a 20 20 | 20 20 20 20 20 20 20 20 | OW...: |
| 05a0 | 20 20 20 20 20 20 20 20 | 20 20 20 20 20 20 20 20 | |
| 05b0 | 20 20 20 54 45 4d 50 20 | 2f 20 54 45 4d 50 20 2f | TEMP / TEMP / |
| 05c0 | 20 50 52 45 43 49 50 20 | 20 2f 20 46 41 4c 4c 20 | PRECIP / FALL |
| 05d0 | 2f 20 44 45 50 54 48 0d | 0d 0a 49 4d 4c 20 20 3a | / DEPTH..IML : |
| 05e0 | 20 49 4d 50 45 52 49 41 | 4c 20 41 49 52 50 4f 52 | IMPERIAL AIRPOR |
| 05f0 | 54 20 20 20 20 3a 20 20 | 20 39 32 20 20 2f 20 20 | T : 92 / |
| 0600 | 35 33 20 20 2f 20 20 20 | 30 2e 30 30 20 20 2f 20 | 53 / 0.00 / |
| 0610 | 20 20 20 4d 20 2f 20 20 | 20 4d 0d 0d 0a 4f 47 41 | M / M...OGA |
| 0620 | 20 20 3a 20 4f 47 41 4c | 4c 41 4c 41 20 41 49 52 | : OGAL LALA AIR |
| 0630 | 50 4f 52 54 20 20 20 20 | 3a 20 20 20 38 37 20 20 | PORT : 87 |
| 0640 | 2f 20 20 35 34 20 20 2f | 20 20 20 30 2e 30 30 20 | / 54 / 0.00 |
| 0650 | 20 2f 20 20 20 20 4d 20 | 2f 20 20 20 4d 0d 0d 0a | / M / M... |
| 0660 | 2e 45 4e 44 0d 0d 0a 0d | 0d 0a 43 4f 4f 50 45 52 | .END.... COOPER |
| 0670 | 41 54 49 56 45 20 4f 42 | 53 45 52 56 41 54 49 4f | ATIVE OB SERVATIO |
| 0680 | 4e 53 0d 0d 0a 56 41 4c | 55 45 53 20 41 52 45 20 | NS...VAL UES ARE |
| 0690 | 46 4f 52 20 54 48 45 20 | 50 41 53 54 20 32 34 20 | FOR THE PAST 24 |
| 06a0 | 48 4f 55 52 53 20 49 4e | 20 4c 4f 43 41 4c 20 54 | HOURS IN LOCAL T |
| 06b0 | 49 4d 45 0d 0d 0a 0d 0d | 0a 2e 42 52 20 4c 42 46 | IME..... BR LBF |
| 06c0 | 20 30 36 31 33 20 43 20 | 44 48 30 37 2f 54 41 49 | 0613 C DH07/TAI |
| 06d0 | 52 5a 58 2f 54 41 49 52 | 5a 4e 2f 50 50 44 52 5a | RZX/TAIR ZN/PPDRZ |
| 06e0 | 5a 2f 53 46 44 52 5a 5a | 2f 53 44 49 52 5a 5a 0d | Z/SFDRZZ /SDIRZZ. |
| 06f0 | 0d 0a 3a 0d 0d 0a 3a 53 | 54 41 54 49 4f 4e 20 4e |:S TATION N |
| 0700 | 41 4d 45 20 20 20 20 20 | 20 20 20 20 20 20 20 20 | AME |
| 0710 | 20 4f 42 53 20 20 2f 20 | 4d 41 58 20 20 2f 20 4d | OBS / MAX / M |
| 0720 | 49 4e 20 20 2f 20 32 34 | 2d 48 52 20 20 2f 20 53 | IN / 24 -HR / S |
| 0730 | 4e 4f 57 20 2f 20 53 4e | 4f 57 0d 0d 0a 3a 20 20 | NOW / SN OW...: |
| 0740 | 20 20 20 20 20 20 20 20 | 20 20 20 20 20 20 20 20 | |
| 0750 | 20 20 20 20 20 20 20 20 | 48 52 20 20 20 2f 20 54 | HR / T |
| 0760 | 45 4d 50 20 2f 20 54 45 | 4d 50 20 2f 20 50 52 45 | EMP / TE MP / PRE |
| 0770 | 43 49 50 20 2f 20 46 41 | 4c 4c 20 2f 20 44 45 50 | CIP / FA LL / DEP |
| 0780 | 54 48 0d 0d 0a 42 55 54 | 4e 31 3a 20 42 55 54 54 | TH...BUT N1: BUTT |
| 0790 | 45 20 20 20 20 20 20 20 | 20 20 20 20 3a 20 44 48 | E : DH |
| 07a0 | 30 36 30 30 20 2f 20 20 | 36 36 20 20 2f 20 20 35 | 0600 / 66 / 5 |
| 07b0 | 31 20 20 2f 20 20 30 2e | 30 30 20 20 2f 20 20 30 | 1 / 0. 00 / 0 |

| | | | |
|------|-------------------------|-------------------------|-------------------|
| 07c0 | 2e 30 20 2f 20 20 20 20 | 30 0d 0d 0a 43 57 59 4e | .0 / 0...CWYN |
| 07d0 | 31 3a 20 43 41 4c 4c 41 | 57 41 59 20 38 57 53 57 | 1: CALLA WAY 8WSW |
| 07e0 | 20 20 20 3a 20 44 48 30 | 38 30 30 20 2f 20 20 38 | : DH0 800 / 8 |
| 07f0 | 31 20 20 2f 20 20 34 39 | 20 20 2f 20 20 30 2e 30 | 1 / 49 / 0.0 |
| 0800 | 30 20 20 2f 20 20 30 2e | 30 20 2f 20 20 20 20 30 | 0 / 0.0 / 0 |
| 0810 | 0d 0d 0a 43 48 4d 4e 31 | 3a 20 43 48 41 4d 42 45 | ...CHMN1 : CHAMBE |
| 0820 | 52 53 20 20 20 20 20 20 | 20 20 3a 20 44 48 30 38 | RS : DH08 |
| 0830 | 30 30 20 2f 20 20 37 36 | 20 20 2f 20 20 35 31 20 | 00 / 76 / 51 |
| 0840 | 20 2f 20 20 30 2e 30 30 | 20 20 2f 20 20 30 2e 30 | / 0.00 / 0.0 |
| 0850 | 20 2f 20 20 20 30 0d | 0d 0a 45 4e 44 4e 31 3a | / 0. . .ENDN1: |
| 0860 | 20 45 4e 44 45 52 53 20 | 20 20 20 20 20 20 20 20 | ENDERS |
| 0870 | 20 3a 20 44 48 30 37 30 | 30 20 2f 20 20 39 32 20 | : DH070 0 / 92 |
| 0880 | 20 2f 20 20 35 32 20 20 | 2f 20 20 30 2e 30 30 20 | / 52 / 0.00 |
| 0890 | 20 2f 20 20 20 20 4d 20 | 2f 20 20 20 20 4d 0d 0d | / M / M.. |
| 08a0 | 0a 45 43 53 4e 31 3a 20 | 45 52 49 43 53 4f 4e 20 | .ECSN1: ERICSON |
| 08b0 | 38 57 4e 57 20 20 20 20 | 3a 20 44 48 30 37 30 30 | 8WNW : DH0700 |
| 08c0 | 20 2f 20 20 39 30 20 20 | 2f 20 20 34 37 20 20 2f | / 90 / 47 / |
| 08d0 | 20 20 30 2e 30 30 20 20 | 2f 20 20 30 2e 30 20 2f | 0.00 / 0.0 / |
| 08e0 | 20 20 20 20 30 0d 0d 0a | 45 55 53 4e 31 3a 20 45 | 0... EUSN1: E |
| 08f0 | 55 53 54 49 53 20 32 4e | 57 20 20 20 20 20 20 3a | USTIS 2N W : |
| 0900 | 20 44 48 30 38 30 30 20 | 2f 20 20 38 37 20 20 2f | DH0800 / 87 / |
| 0910 | 20 20 35 32 20 20 2f 20 | 20 30 2e 30 30 20 20 2f | 52 / 0.00 / |
| 0920 | 20 20 20 20 4d 20 2f 20 | 20 20 20 4d 0d 0d 0a 48 | M / M...H |
| 0930 | 41 59 4e 31 3a 20 48 41 | 59 45 53 20 43 45 4e 54 | AYN1: HA YES CENT |
| 0940 | 45 52 20 20 20 20 3a 20 | 44 48 30 37 30 30 20 2f | ER : DH0700 / |
| 0950 | 20 20 38 39 20 20 2f 20 | 20 35 31 20 20 2f 20 20 | 89 / 51 / |
| 0960 | 30 2e 30 30 20 20 2f 20 | 20 30 2e 30 20 2f 20 20 | 0.00 / 0.0 / |
| 0970 | 20 20 30 0d 0d 0a 49 4d | 50 4e 31 3a 20 49 4d 50 | 0...IM PN1: IMP |
| 0980 | 45 52 49 41 4c 20 20 20 | 20 20 20 20 20 3a 20 44 | ERIAL : D |
| 0990 | 48 30 37 33 30 20 2f 20 | 20 39 32 20 20 2f 20 20 | H0730 / 92 / |
| 09a0 | 35 32 20 20 2f 20 20 30 | 2e 30 30 20 20 2f 20 20 | 52 / 0.00 / |
| 09b0 | 30 2e 30 20 2f 20 20 20 | 20 30 0d 0d 0a 4c 43 4f | 0.0 / 0...LCO |
| 09c0 | 4e 31 3a 20 4c 49 53 43 | 4f 20 20 20 20 20 20 20 | N1: LISCO |
| 09d0 | 20 20 20 20 3a 20 44 48 | 30 38 30 30 20 2f 20 20 | : DH 0800 / |
| 09e0 | 20 4d 20 20 2f 20 20 20 | 4d 20 20 2f 20 20 30 2e | M / M / 0. |
| 09f0 | 30 30 20 20 2f 20 20 30 | 2e 30 20 2f 20 20 20 20 | 00 / 0.0 / |
| 0a00 | 30 0d 0d 0a 4d 44 44 4e | 31 3a 20 4d 41 44 52 49 | 0...MDDN 1: MADRI |
| 0a10 | 44 20 20 20 20 20 20 20 | 20 20 20 3a 20 44 48 30 | D : DH0 |
| 0a20 | 38 30 30 20 2f 20 20 38 | 39 20 20 2f 20 20 35 31 | 800 / 89 / 51 |
| 0a30 | 20 20 2f 20 20 30 2e 30 | 30 20 20 2f 20 20 20 20 | / 0.0 0 / |
| 0a40 | 4d 20 2f 20 20 20 4d | 0d 0d 0a 4d 4c 4e 4e 31 | M / M ...MLNN1 |
| 0a50 | 3a 20 4d 55 4c 4c 45 4e | 20 20 20 20 20 20 20 20 | : MULLEN |
| 0a60 | 20 20 3a 20 44 48 30 38 | 33 30 20 2f 20 20 37 33 | : DH08 30 / 73 |

0a70 20 20 2f 20 20 34 36 20 20 2f 20 20 30 2e 30 30 / 46 / 0.00
 0a80 20 20 2f 20 20 30 2e 30 20 2f 20 20 20 20 30 0d / 0.0 / 0.
 0a90 0d 0a 4e 50 4c 4e 31 3a 20 4e 20 50 4c 41 54 54 ..NPLN1: N PLATT
 0aa0 45 20 45 58 20 46 41 52 4d 3a 20 44 48 30 38 30 E EX FAR M: DH080
 0ab0 30 20 2f 20 20 38 38 20 20 2f 20 20 34 39 20 20 0 / 88 / 49
 0ac0 2f 20 20 30 2e 30 30 20 20 2f 20 20 20 20 4d 20 / 0.00 / M
 0ad0 2f 20 20 20 20 4d 0d 0d 0a 4f 47 4c 4e 31 3a 20 / M.. .OGLN1:
 0ae0 4f 47 41 4c 4c 41 4c 41 20 20 20 20 20 20 20 20 OGALLALA
 0af0 3a 20 44 48 30 37 30 30 20 2f 20 20 20 38 37 20 20 : DH0700 / 87
 0b00 2f 20 20 35 33 20 20 2f 20 20 30 2e 30 30 20 20 / 53 / 0.00
 0b10 2f 20 20 30 2e 30 20 2f 20 20 20 20 30 0d 0d 0a / 0.0 / 0...
 0b20 4f 4e 4c 4e 31 3a 20 4f 4e 45 49 4c 4c 20 20 20 ONLN1: O NEILL
 0b30 20 20 20 20 20 20 20 3a 20 44 48 30 37 30 30 20 : DH0700
 0b40 2f 20 20 37 31 20 20 2f 20 20 35 32 20 20 2f 20 / 71 / 52 /
 0b50 20 30 2e 30 30 20 20 2f 20 20 30 2e 30 20 2f 20 0.00 / 0.0 /
 0b60 20 20 20 30 0d 0d 0a 50 41 58 4e 31 3a 20 50 41 0...P AXN1: PA
 0b70 58 54 4f 4e 20 20 20 20 20 20 20 20 20 20 20 3a 20 XTON :
 0b80 44 48 30 39 30 30 20 2f 20 20 20 20 4d 20 20 2f 20 DH0900 / M /
 0b90 20 20 4d 20 20 2f 20 20 30 2e 30 30 20 20 2f 20 M / 0.00 /
 0ba0 20 20 20 4d 20 2f 20 20 20 20 4d 0d 0d 0a 53 54 M / M...ST
 0bb0 41 4e 31 3a 20 53 54 41 50 4c 45 54 4f 4e 20 35 AN1: STA PLETON 5
 0bc0 57 20 20 20 20 3a 20 44 48 30 37 30 30 20 2f 20 W : D H0700 /
 0bd0 20 38 30 20 20 2f 20 20 34 38 20 20 2f 20 20 20 30 80 / 48 / 0
 0be0 2e 30 30 20 20 2f 20 20 20 20 4d 20 2f 20 20 20 .00 / M /
 0bf0 20 4d 0d 0d 0a 53 50 56 4e 31 3a 20 53 50 52 49 M...SPV N1: SPRI
 0c00 4e 47 56 49 45 57 20 32 4e 57 20 20 3a 20 44 48 NGVIEW 2 NW : DH
 0c10 30 36 30 30 20 2f 20 20 36 38 20 20 2f 20 20 34 0600 / 68 / 4
 0c20 36 20 20 2f 20 20 30 2e 30 30 20 20 2f 20 20 30 6 / 0. 00 / 0
 0c30 2e 30 20 2f 20 20 20 20 30 0d 0d 0a 54 41 59 4e .0 / 0...TAYN
 0c40 31 3a 20 54 41 59 4c 4f 52 20 20 20 20 20 20 20 1: TAYLO R
 0c50 20 20 20 3a 20 44 48 30 38 30 30 20 2f 20 20 37 : DH0 800 / 7
 0c60 37 20 20 2f 20 20 34 39 20 20 2f 20 20 30 2e 30 7 / 49 / 0.0
 0c70 30 20 20 2f 20 20 30 2e 30 20 2f 20 20 20 20 30 0 / 0. 0 / 0
 0c80 0d 0d 0a 2e 45 4e 44 0d 0d 0a 0d 0a 54 48 45END.THE
 0c90 53 45 20 44 41 54 41 20 41 52 45 20 50 52 45 4c SE DATA ARE PREL
 0ca0 49 4d 49 4e 41 52 59 20 41 4e 44 20 48 41 56 45 IMINARY AND HAVE
 0cb0 20 4e 4f 54 20 55 4e 44 45 52 47 4f 4e 45 20 46 NOT UND ERGONE F
 0cc0 49 4e 41 4c 20 51 55 41 4c 49 54 59 20 0d 0d 0a INAL QUA LITY ...
 0cd0 43 4f 4e 54 52 4f 4c 20 42 59 20 54 48 45 20 4e CONTROL BY THE N
 0ce0 41 54 49 4f 4e 41 4c 20 43 49 4d 41 54 49 43 ATIONAL CLIMATIC
 0cf0 20 44 41 54 41 20 43 45 4e 54 45 52 20 2f 4e 43 DATA CE NTER /NC
 0d00 44 43 2f 2e 20 54 48 45 52 45 46 4f 52 45 2e 2e DC/. THE REFORO..
 0d10 2e 0d 0d 0a 54 48 45 53 45 20 44 41 54 41 20 41THES E DATA A

| | | | |
|------|-------------------------|-------------------------|----------------------------------|
| 0d20 | 52 45 20 53 55 42 4a 45 | 43 54 20 54 4f 20 52 45 | RE SUBJECT TO RE |
| 0d30 | 56 49 53 49 4f 4e 2e 20 | 46 49 4e 41 4c 20 41 4e | VISION. FINAL ANALYSIS. |
| 0d40 | 44 20 43 45 52 54 49 46 | 49 45 44 20 43 4c 49 4d | CERTIFIED CLIMATE |
| 0d50 | 41 54 45 20 44 41 54 41 | 20 0d 0d 0a 43 41 4e 20 | DATA ... CAN |
| 0d60 | 42 45 20 41 43 43 45 53 | 53 45 44 20 41 54 20 57 | BE ACCESSED AT WWW.NCDC.NOAA.GOV |
| 0d70 | 57 57 2e 4e 43 44 43 2e | 4e 4f 41 41 2e 47 4f 56 | \$\$..... |
| 0d80 | 2e 0d 0d 0a 20 0d 0d 0a | 24 24 0d 0d 0a 0d 0d 0a | .LBF-969 088. |
| 0d90 | 17 4c 42 46 2d 39 36 39 | 30 38 38 0a | |